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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/821,868	04/12/2004	Jussi Pihlajamaa	060282.00150	1847
32294 7590 11/05/2008 SQUIRE, SANDERS & DEMPSEY L.L.P. 8000 TOWERS CRESCENT DRIVE 14TH FLOOR VIENNA, VA 22182-6212				
EXAMINER				
THIER, MICHAEL				
ART UNIT		PAPER NUMBER		
2617				
MAIL DATE		DELIVERY MODE		
11/05/2008		PAPER		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/821,868

**Applicant(s)**

PIHLAJAMAA ET AL.

**Examiner**

MICHAEL T. THIER

**Art Unit**

2617

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 11 September 2008.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 6-8, 10-13 and 17-29 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1, 6-8, 10-13 and 17-29 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some \* c) ☐ None of:  
1. ☒ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/SB-08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/11/2008 has been entered.

### ***Response to Arguments***

2. Applicant's arguments with respect to claims 1, 6-8, 10-13, and 17-29 have been considered but are moot in view of the new ground(s) of rejection.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 6-8, 10-13, and 17-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bridgelall (US 6717516) in view of Gunzelmann et al. (WO/02091601) in further view of Bhaskaran et al. (US 2004/0128696).

**Regarding claims 1, 6, 13, 17, 22, and 26.** Bridgelall teaches a radio equipment system having a modular structure (figure 2), the system comprising:

a baseband modem for modulating and demodulating; (figure 2 item 46, baseband means)

a digital interface; (figure 2 item 42, digital interfacing means) and

a radio including a digitally operating radio frequency control unit and a radio frequency parts unit, (figure 2 item 34, the RF unit is inherently digitally operated and column 2 lines 31-39, column 5 lines 1-15)

wherein the baseband modem and the radio frequency unit respectively form physically separate modules which are connected with each other by the digital interface. (see figure 2 which shows the RF unit 34, outside the box 58, which contains the baseband modem 46)

Although Bridgelall shows the RF unit 34 outside the box 58, which would make one of ordinary skill in the art to think that it is possibly a separate component, Bridgelall does not specifically disclose that the RF module and the baseband modem are physically separate modules connected by a digital interface.

Gunzelmann teaches a transmission configuration in figure 1 (shown on front cover, along side of the abstract). He clearly shows the baseband module, item 1, being physically separate from the RF unit, item 3, and connected by a digital interface, item 2. Further see the 4<sup>th</sup> paragraph on the 1<sup>st</sup> page of the translation, which clearly states that the baseband parts and the RF parts are separate from one another (i.e. separate integrated circuits (chips)). The examiner would further like to point to the abstract or the

7<sup>th</sup> paragraph on the 1<sup>st</sup> page of the translation (starts with According to invention...) which explains the baseband component (baseband construction unit), radio frequency unit including digitally operating frequency control means and radio frequency parts, (i.e. high frequency construction unit using digital data transmission) and the digital interface (interface 2, having exclusively digital structure), which therefore teaches all the limitations of the claims, except for the fact that the baseband module includes a baseband modem, which is clearly taught by the primary reference, Bridgelall, in figure 2 item 46.

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to utilize the teachings of Gunzelmann with the teachings of Bridgelall. The motivation for doing so would have been to allow for high flexibility of the structure. (Gunzelmann abstract)

Although Bridgelall teaches the idea of FEC and symbol mapping and demapping (column 5 lines 1-15, 29-45 and column 7 lines 33-38), he does not specifically disclose that the modem performs the FEC coding and symbol mapping and demapping.

Bhaskaran teaches the idea of turbo coding for upstream and downstream transmissions (title and abstract). He teaches the idea that the modem performs FEC coding and symbol mapping and demapping in figure 2 as items 202, 205, 207, and 210. Further see par. 6, 9, 30, and 56 which explains that forward error correction is common in modems (par. 6 and 9), that the signal goes through a mapper and demapper which is a part of the modem (items 205 and 207 of figure 2, which

represents the modem, read on a mapper and demapper and par. 56 clearly recites that 205 is a symbol mapper) and that figure 2 represents the modem and contains an FEC coding component (par. 30).

Therefore it would have been obvious for one of ordinary skill in the art at the time of invention to utilize the teachings of Bhaskaran with the teachings as in the combination of Bridgelall and Gunzelmann. The motivation for doing so would have been to allow for providing coding schemes that provide better performance under noise conditions. (Bhaskaran par. 8)

**Regarding claims 7 and 25.** Bridgelall further teaches sending, from the baseband modem module to the radio frequency unit module, transmitter data including in-phase component signals and quadratic phase component signals; sending, from the baseband modem module to the radio frequency unit module, transmitter clock signals; sending, from the baseband modem module to the radio frequency unit module, control signals providing support for type-specific functionalities; sending, from the radio frequency unit module to the baseband modem module, receiver clock signals; sending, from the radio frequency unit module to the baseband modem module, receiver data including in-phase component signals and quadratic phase component signals; and exchanging, between the radio frequency unit module and the baseband modem module, microprocessor signals; wherein said sending steps and said exchanging step are driven by the digital interface. (column 5 lines 29-45 and column 6 line 37 to column 7 line 3 reads on the limitations in this claim)

**Regarding claim 8.** Bridgelall further teaches said method further comprising providing all signals as digital signals, and wherein a clock rate is provided as a system symbol clock rate, except for a case that a function in the modem utilizes two samples per symbol where a double symbol rate frequency is supported. (column 2 lines 31-38 and column 6 line 37 to column 7 line 3 reads on the limitations in this claim)

**Regarding claims 10, 12, 27, and 29.** Bridgelall further teaches wherein the radio frequency control means within the module forming the radio frequency unit includes respective control loops performing pulse shape filtering, transmitter and receiver correction, receiver timing recovery and carrier recovery. (column 5 lines 29-45 reads on the limitations in this claim)

**Regarding claims 11 and 28.** Bridgelall further teaches wherein the transmitter and receiver correction comprises a quadratic error correction, a balance error correction, a bias error correction, and a gain error correction. (column 5 lines 29-45 reads on the limitations in this claim, the different types of correction means are well known in the art and would have been obvious to one of ordinary skill to allow for the correct signal to be transmitted without error.)

**Regarding claim 18.** Bhaskaran further teaches wherein the module forming the baseband modem comprises: correction means for performing forward error correction coding and decoding (figure 2 items 202, and 210) ; and symbol mapping means for symbol mapping and demapping. (figure 2 items 205 and 207 and par. 56 which clearly recites that 205 is a symbol mapper)

**Regarding claims 19 and 21.** Bridgelall further teaches wherein the radio frequency control means comprises respective control loops for pulse shape filtering, transmitter and receiver correction loops, timing recovery means for performing receiver timing recovery, and carrier recovery means for performing carrier timing recovery. (column 5 lines 29-45 reads on the limitations in this claim)

**Regarding claim 20.** Bridgelall further teaches wherein the transmitter and receiver correction loops comprise quadratic error correction means for performing quadratic error correction, balance error correction means for performing balance error correction, bias error correction means for performing bias error correction, and a gain error correction means for performing bias error correction. (column 5 lines 29-45 reads on the limitations in this claim, the different types of correction means are well known in the art and would have been obvious to one of ordinary skill to allow for the correct signal to be transmitted without error.)

**Regarding claim 23.** Bridgelall further teaches wherein the signals are exchanged serially. (column 7 lines 4-37)

**Regarding claim 24.** Bridgelall further teaches wherein the signals are exchanged in parallel. (column 7 lines 4-37)

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHAEL T. THIER whose telephone number is (571) 272-2832. The examiner can normally be reached on Monday thru Friday 7:30-4:30.



If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexander Eisen can be reached on (571) 272-7687. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MICHAEL T THIER/  
Examiner, Art Unit 2617  
11/4/08

/Alexander Eisen/

Supervisory Patent Examiner, Art Unit 2617